Texaco Sunburst Works Refinery

DEQ-Sunburst Public Meeting

July 20, 2011

Introduction

- Chris Cote – DEQ Project Officer, Site Response Section
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  - ccote2@mt.gov
  - 1100 N. Last Chance Gulch, PO Box 200901, Helena, MT
  - Sunburst DEQ Webpage - http://deq.mt.gov/StateSuperfund/sunburst.mcpx
  - Sunburst Public Library – Document Repository

Meeting Format

- Please sign the “sign-in” sheet
- 5 main topics
- Talk should take about 40 minutes
- Question and Answer session at end
- Please hold questions until the Q+A session

Tonight's Agenda

- Brief Refinery and Investigations History
- CECRA program overview
- Presentation of Recent Environmental Findings
  - Upcoming "In-town" soil sampling
  - Petroleum Recovery
  - Vapor Intrusion investigation wrap-up
  - Phase II RI – September 2009 to March 2010
  - Phase II RI – July 2010 to present

Refinery Operations and Environmental Investigations

1924 – 2011

History of Refinery Operations

- 1924 - Refinery Built
- 1926 - Refinery Operational – 800 barrel per day capacity
- 1955 - Basement of House explodes in Town from gasoline vapors attributed to pipeline leak, house is relocated
- 1955 to 1957 - Texaco Recovers 182,448 gallons of product/water, monitoring continues until 1973
- 1957 - Peak year for refinery, production of 8000 barrels per day (336,000 gallons per day)

History of Refinery Operations

- 1961 - Refinery shuts down and sells property and equipment to Pacific Hide and Fur
- 1967 - Pacific Hide and Fur sells property to private individuals

Environmental Investigation History

- 1984 EPA Federal Superfund (CERCLA) Assessment
- 1989 Listed with State Superfund (CECRA)
- 1989 Administrative Order on Consent Signed between DEQ and Texaco
- 1990 - 2001 Various Investigations and Voluntary Cleanup Plan
- 2001 Chevron mergers with Texaco and assumes responsibility for cleanup
- 2001 Groundwater Sampling and Analysis Plan implemented

Environmental Investigation History

- 2003 Yearly Inspections of on site repositories
- 2003 DEQ's Proposed Plan Issued and Public Comment,
  - DEQ receives data from 3rd Party Investigations
- Based on DEQ's analysis of 3rd Party Data, DEQ requires additional investigations

CECRA Process – Path Forward

- **Remedial Investigation** – Find all the contamination, understand how it got there, collect data to help with cleanup options
- **Risk Assessment** – Does the contamination pose a threat to human health or the environment?
- **Feasibility Study** – Evaluate different methods to clean up the contamination
- **Proposed Plan** – DEQ's selection of how to clean up the contamination
- **Record of Decision** – DEQ's final plan to clean up the site, takes into account public comment
- **Final Cleanup Conducted** – DEQ continues to oversee cleanup until cleanup levels are met

Who's doing all this?

DEQ

Decision maker, ultimately responsible to get the site cleaned up, have an order in place requiring investigation

Chevron

Successor to Texaco, responsible to perform all work required by DEQ

Trihydro

Chevron's consultant, performs work on behalf of Chevron

CDM

DEQ's consultant, assists DEQ with technical issues, provides oversight of field work, collects duplicate samples

SRG

3rd Party group administering funds from lawsuit to conduct private cleanup actions (needs DEQ permission to do this)

WET

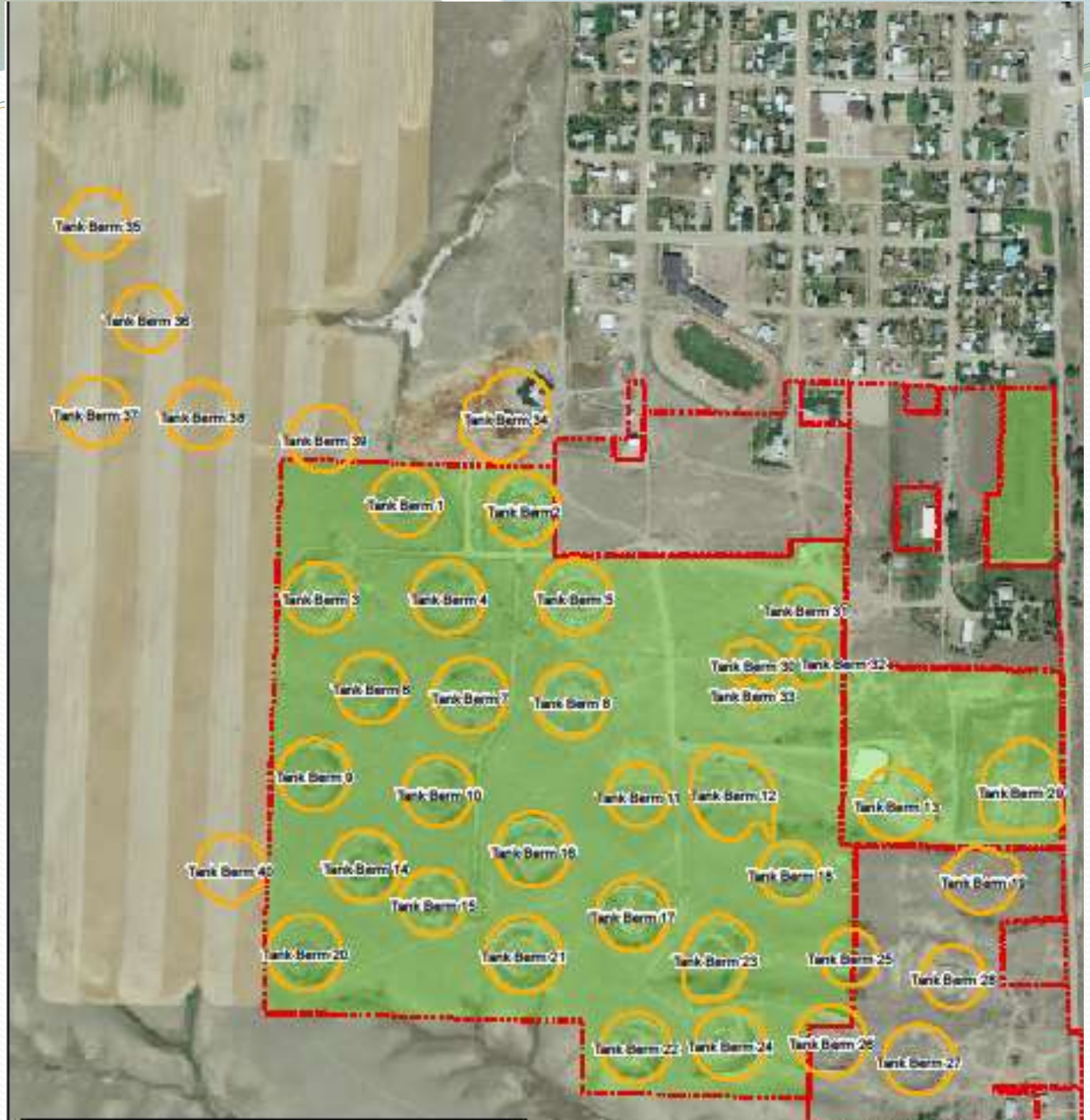
SRG's consultant, performs work on behalf of the SRG

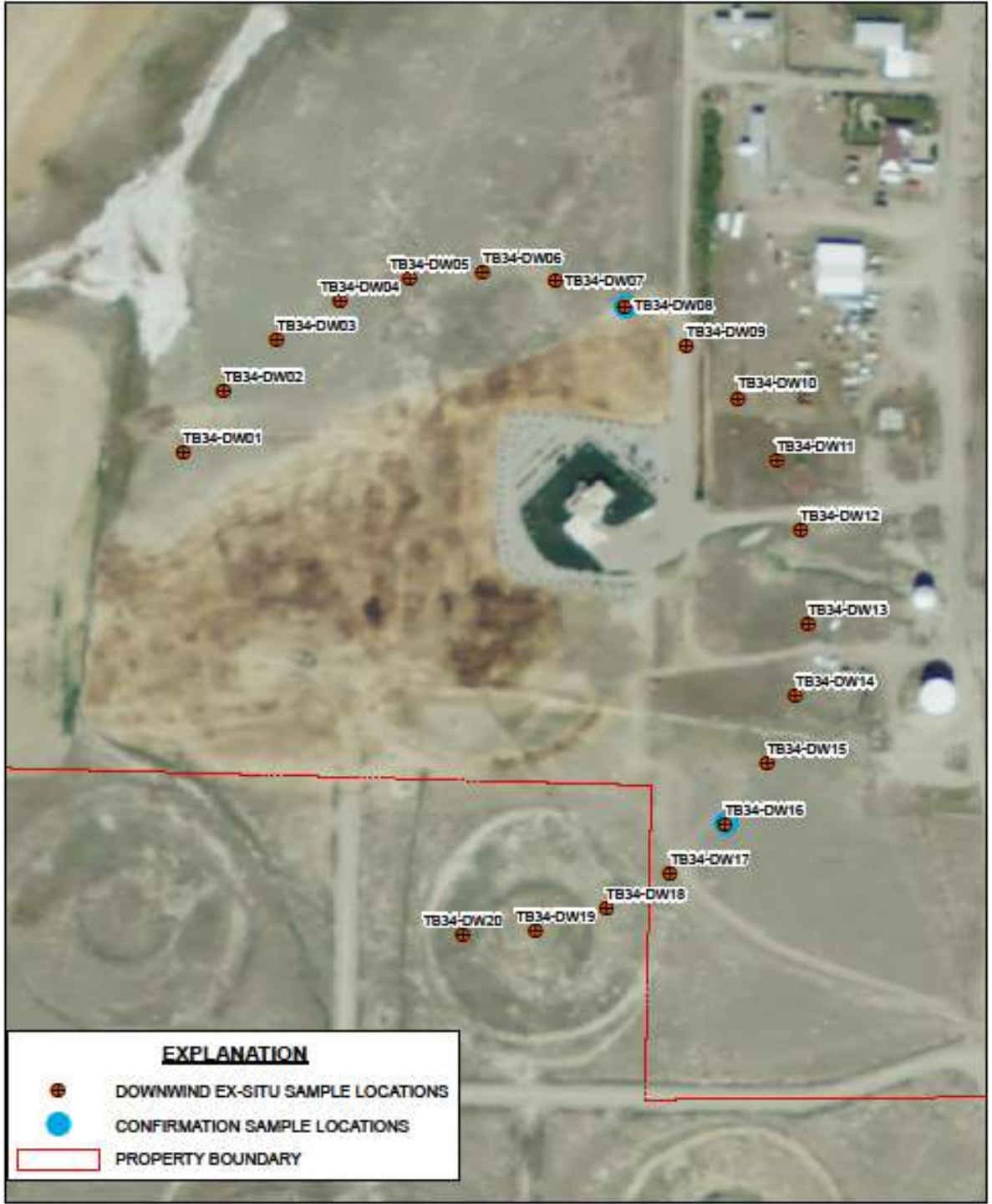
Soil Sampling on Properties in Sunburst

August 2011

Back in 2008……

- One house (built in a former tank berm) was found to have soil contamination (lead) present in the yard
- All contaminated soils were removed and yard replaced, but questions remained as to whether or not additional yards contain contaminated refinery soils


Tank Berm 35
Tank Berm 36
Tank Berm 37
Tank Berm 38
Tank Berm 39
Tank Berm 34
Tank Berm 1
Tank Berm 2
Tank Berm 3
Tank Berm 4
Tank Berm 5
Tank Berm 31
Tank Berm 30
Tank Berm 32
Tank Berm 6
Tank Berm 7
Tank Berm 8
Tank Berm 33
Tank Berm 9
Tank Berm 10
Tank Berm 11
Tank Berm 12
Tank Berm 29
Tank Berm 40
Tank Berm 14
Tank Berm 16
Tank Berm 15
Tank Berm 17
Tank Berm 20
Tank Berm 21
Tank Berm 23
Tank Berm 25
Tank Berm 28
Tank Berm 22
Tank Berm 24
Tank Berm 26
Tank Berm 27


TB34-DW05
TB34-DW06
TB34-DW04
TB34-DW07
TB34-DW08
TB34-DW03
TB34-DW09
TB34-DW02
TB34-DW10
TB34-DW01
TB34-DW11
TB34-DW12
TB34-DW13
TB34-DW14
TB34-DW15
TB34-DW16
TB34-DW17
TB34-DW18
TB34-DW20
TB34-DW19
EXPLANATION
DOWNWIND EX-SITU SAMPLE LOCATIONS
CONFIRMATION SAMPLE LOCATIONS
PROPERTY BOUNDARY

EXPLANATION

BERM EXCAVATION

AVERAGE BERM HEIGHT - 6 FEET
SURFACE AREA - 9275 SQUARE FEET
APPROXIMATE VOLUME REMOVED - 2060 CUBIC YARDS

N

0 75'

Trihydro Corporation
1252 Commerce Drive
Laramie, WY 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

APPENDIX A

BORROW SOIL ASSESSMENT - TANK BERM 3

RESIDENTIAL SOIL INVESTIGATION
FORMER TEXACO SUNBURST WORKS REFINERY
SUNBURST, MONTANA

Drawn By: PH	Checked By: JK	Scale: 1" = 75'	Date: 06/07/11	File: Sunburst_RSIWP_Figure1.mx

Public Outreach

- DEQ and Chevron seek public input from Sunburst residents to help locate refinery soils in yards
- Sampling of 5 properties, cleanup work on 2 properties, 1 property to be cleaned up later this summer, and 2 properties that did not need cleanup
- DEQ determines that a sampling program is necessary to locate remaining refinery soils in yards
- Chevron submits a work plan to DEQ on June 15, 2011, DEQ revises and approves this past Monday

August 2011 Town of Sunburst Soil Sampling

- Comprehensive sampling program addressing 53 separate properties falling into 4 categories:
  - Suspected to have refinery soils
  - Known to have backfill, but unknown source
  - Known to have backfill, potential alternative source
  - Random sampling

What to expect

- Sampling should take between an hour and about a half day depending on the number of samples needed
- Sampling will either be done using hand tools or a small Geoprobe drilling rig if deeper or numerous samples are needed
- No damage to the yards should occur
- Holes/divets from sample collection will be filled in.
- If produce garden or children's play area present, those areas will be specifically targeted
- DEQ will provide sampling results to residents

Then what?

- Results are compared to soil screening levels
  - Lead residential – 400 parts per million (EPA)
  - Lead commercial – 800 parts per million (EPA)
  - Petroleum compounds compared to DEQ Risk Based Corrective Action Guidance Document screening levels
- If soils are from the refinery and are determined to exhibit a risk to health or the environment, DEQ will require soil removal and restoration of the property to its original condition


I-15
TOWN
OF
SUNBURST
Soil
Stockpile

Petroleum Recovery

December 2007 to present

Petroleum Recovery Summary

- DEQ requires ongoing petroleum recovery from any monitoring well where it is found
- Currently 27 wells in the monitoring network, 12 wells had measurable petroleum in June 2011
- Less than 0.5 feet petroleum = passive recovery
- Greater than 0.5 feet petroleum = active recovery
- Manual recovery to extent practicable
- 711 gallons petroleum removed since December 2007

Active Recovery System

Passive Absorbent "socks"

Active Recovery System

EXPLANATION

- WET MONITORING WELL
- MONITORING WELL
- SONIC BORING
- PROPERTY BOUNDARY

N

Trihydro

FIGURE 1

FLUID LEVEL GAUGING LOCATIONS

Expansion of Active Recovery

- 4 Monitoring locations being evaluated for installing new active recovery systems
  - Testing in July 2011, install in August - September 2011 if they work

EXPLANATION

- WET MONITORING WELL
- MONITORING WELL
- SONIC BORING
- PROPERTY BOUNDARY

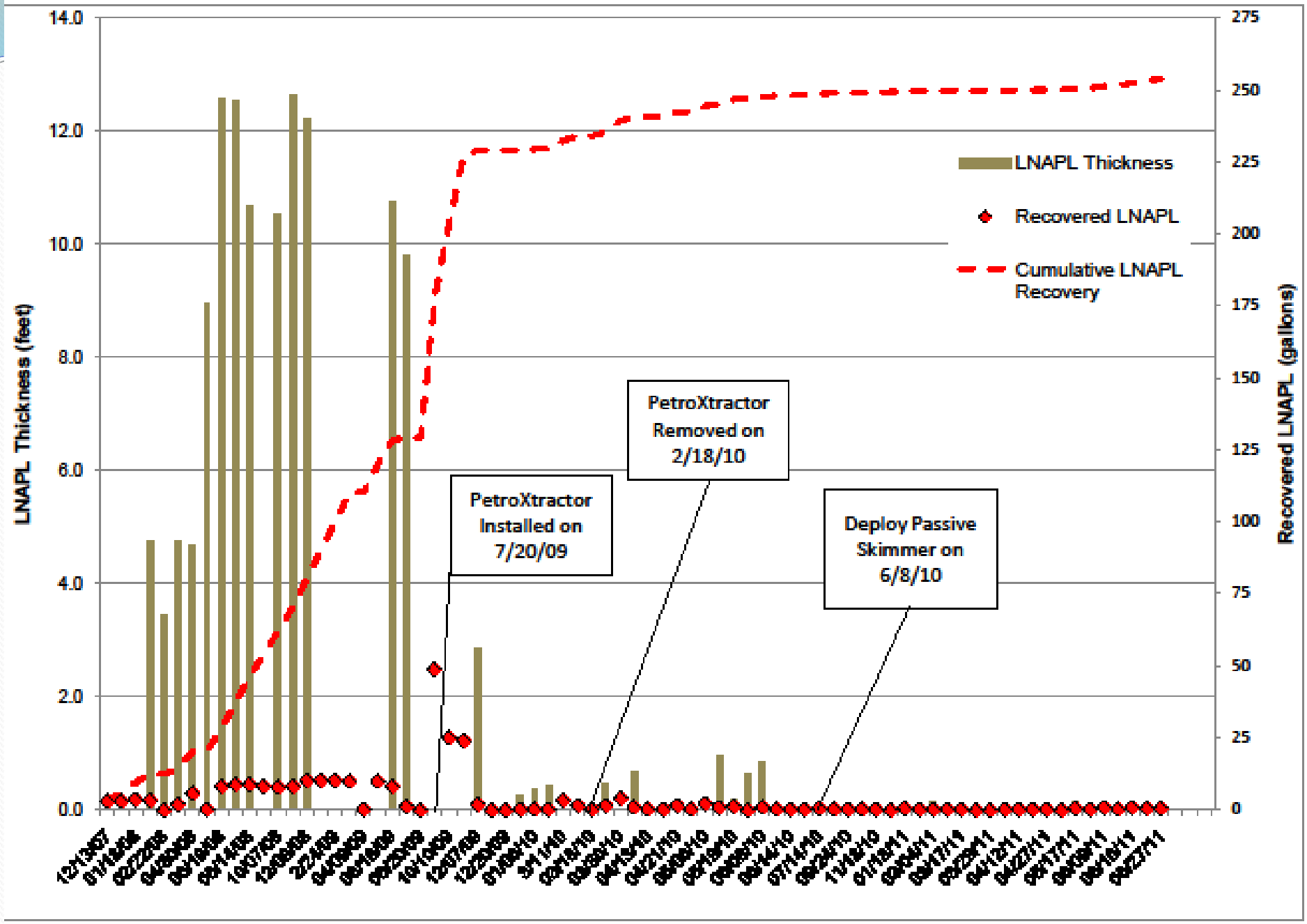
N

Trihydro

FIGURE 1

FLUID LEVEL GAUGING LOCATIONS

FIGURE 5. RECOVERED LNAPL AND LNAPL THICKNESS SUMMARY, PA-1
FORMER TEXACO SUNBURST WORKS REFINERY, SUNBURST, MONTANA

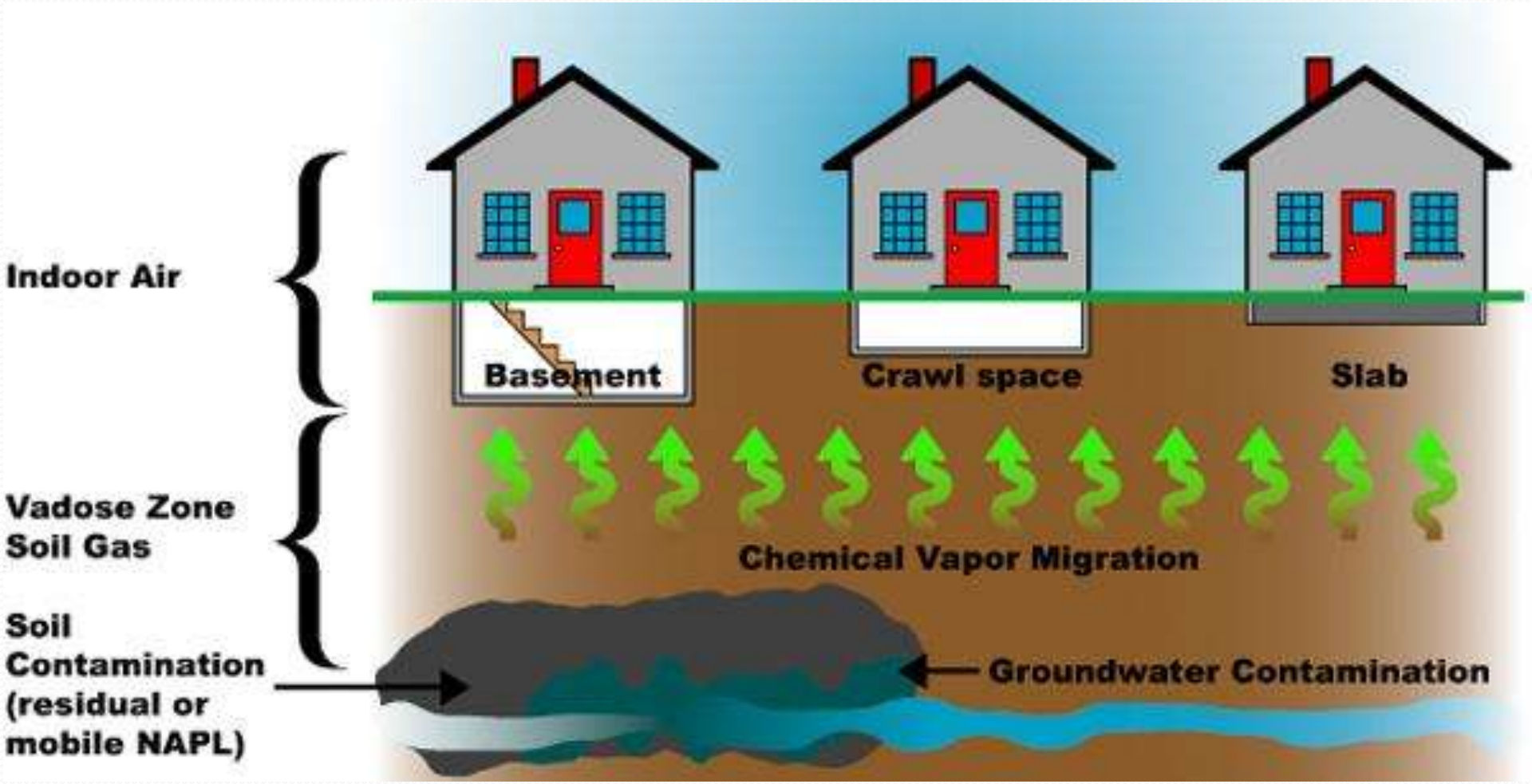


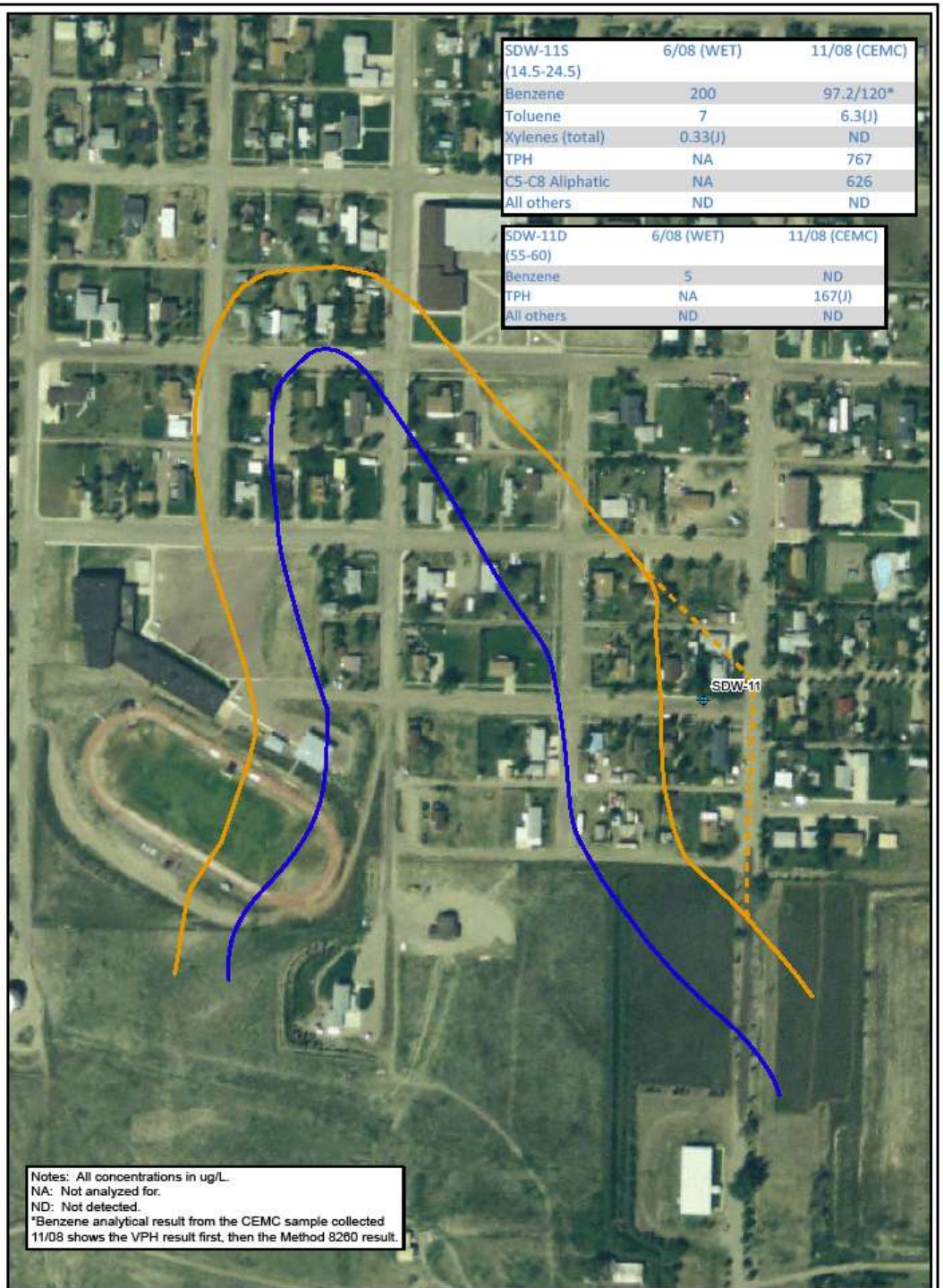
Vapor Intrusion Investigation Wrap-up

Winter 2009 and Winter 2010

What is Vapor Intrusion?

- Vapor Intrusion – The movement of vapors from contamination in soil or groundwater from below ground through the soil and into buildings above or near the contamination
- For this to occur, contamination must be “volatile” or able to evaporate from its source


Indoor Air
Vadose Zone
Soil Gas
Soil
Contamination
(residual or
mobile NAPL)
Basement
Crawl space
Slab
Chemical Vapor Migration
Groundwater Contamination


SDW-11S (14.5-24.5) 6/08 (WET) 11/08 (CEMC)
Benzene 200 97.2/120*
Toluene 7 6.3(J)
Xylenes (total) 0.33(J) ND
TPH NA 767
C5-C8 Aliphatic NA 626
All others ND ND
SDW-11D (55-60) 6/08 (WET) 11/08 (CEMC)
Benzene 5 ND
TPH NA 167(J)
All others ND ND
SDW-11
Notes: All concentrations in ug/L.
NA: Not analyzed for.
ND: Not detected.
*Benzene analytical result from the CEMC sample collected 11/08 shows the VPH result first, then the Method 8260 result.

Vapor Intrusion (VI) Investigation Summary

- High School, Elementary School, Church on the Rock and 34 homes sampled
- 1 residence (located close to tank farm and known petroleum on groundwater) found to have VI pathway
  - Mitigation system installed June 2009 to prevent VI from occurring
- All other structures show no evidence of a VI pathway
- No further action planned for VI

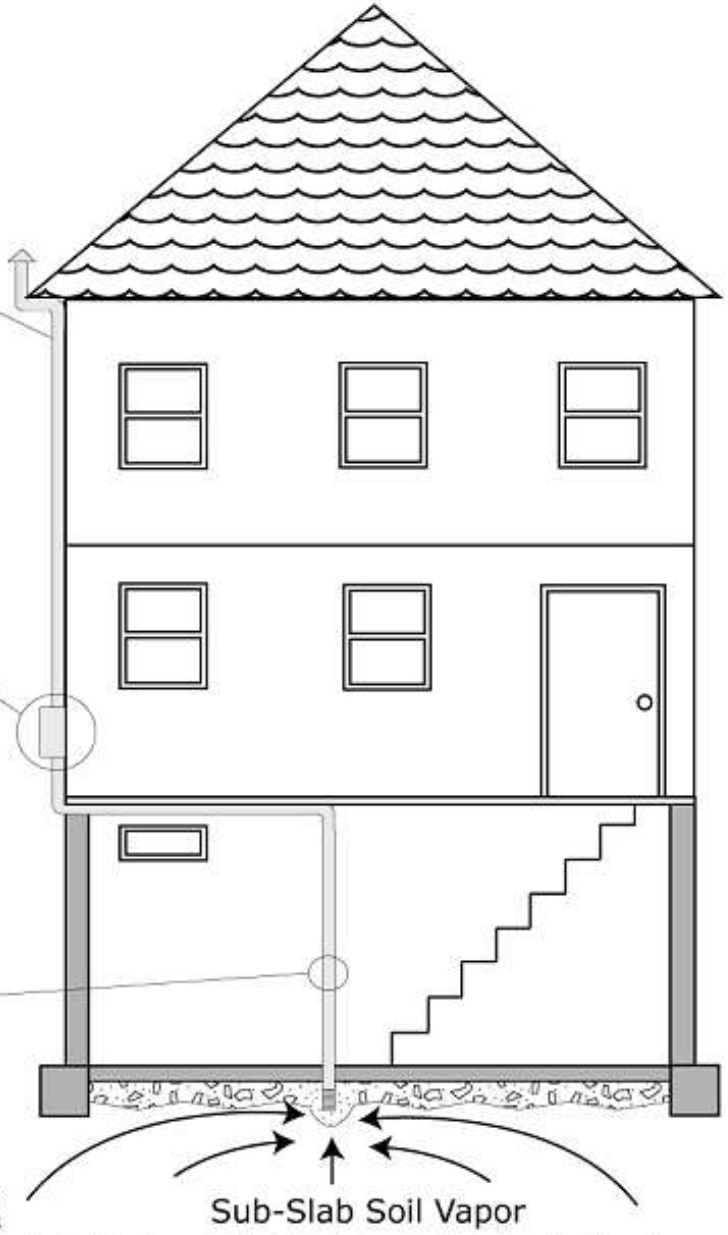
Sub-Slab Depressurization System

(commonly called a radon mitigation system)

The vent pipe is routed uo the side of the structure to a location above the roof line.

A fan is used to draw soil vapor from beneath the slab.

A liquid gauge, or manometer is used to verify that the system is operating properly



A sub-slab depressurization system vents contaminated soil vapor before it enters a structure. The fan draws vapor from beneath the building outside to the roof line where it is released to the outside air.

Phase II Remedial Investigation

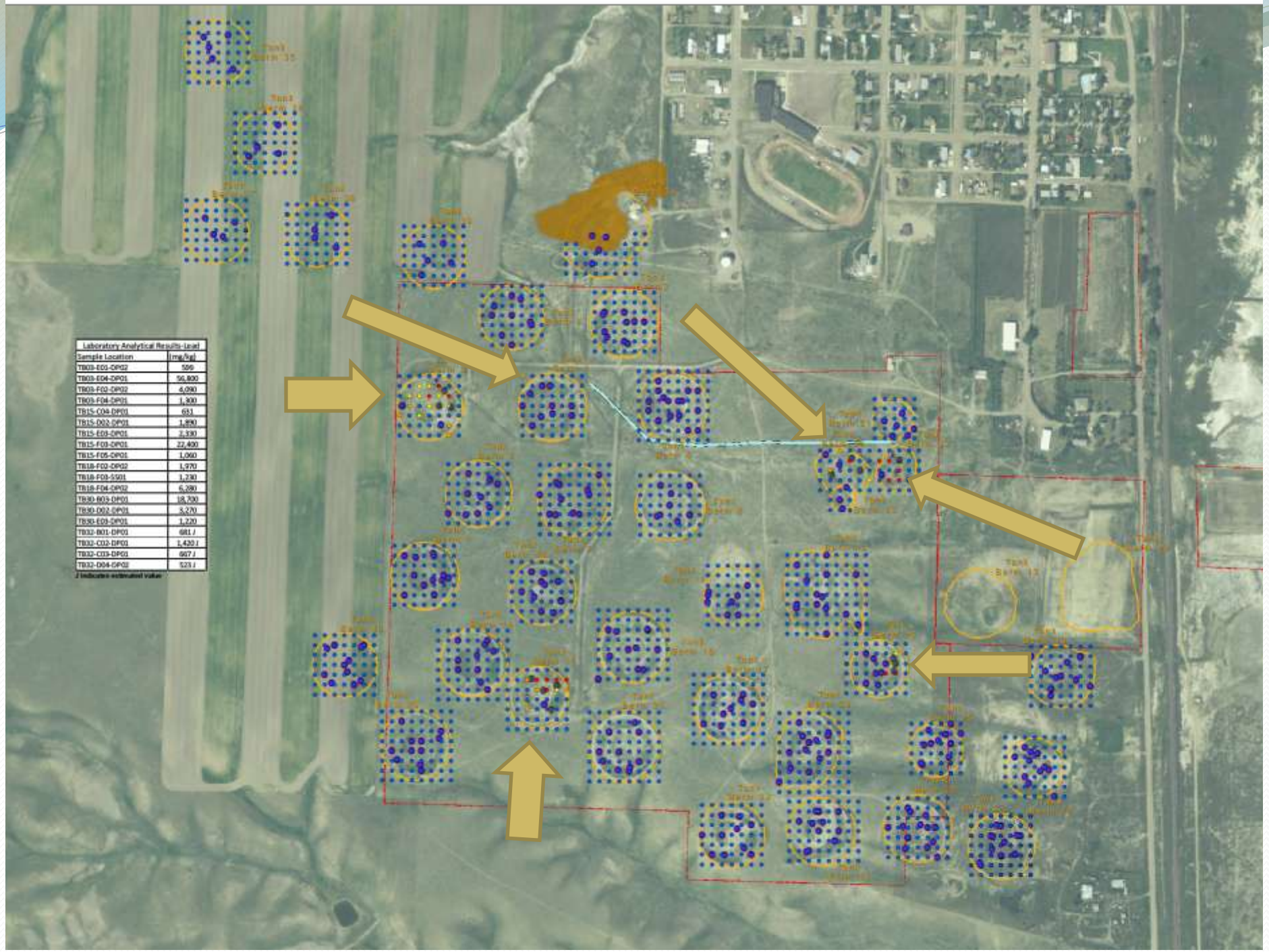
September 2009 – March 2010

Investigation Overview

- Limited scope investigation focusing on:
  - Surface Soils in tank berms and on refinery property
  - Subsurface Soils in tank berms
  - Groundwater quality and petroleum on groundwater
  - Surface water drainages
  - High school and elementary school surface soil
  - Residential soils (limited to residents that contacted DEQ)

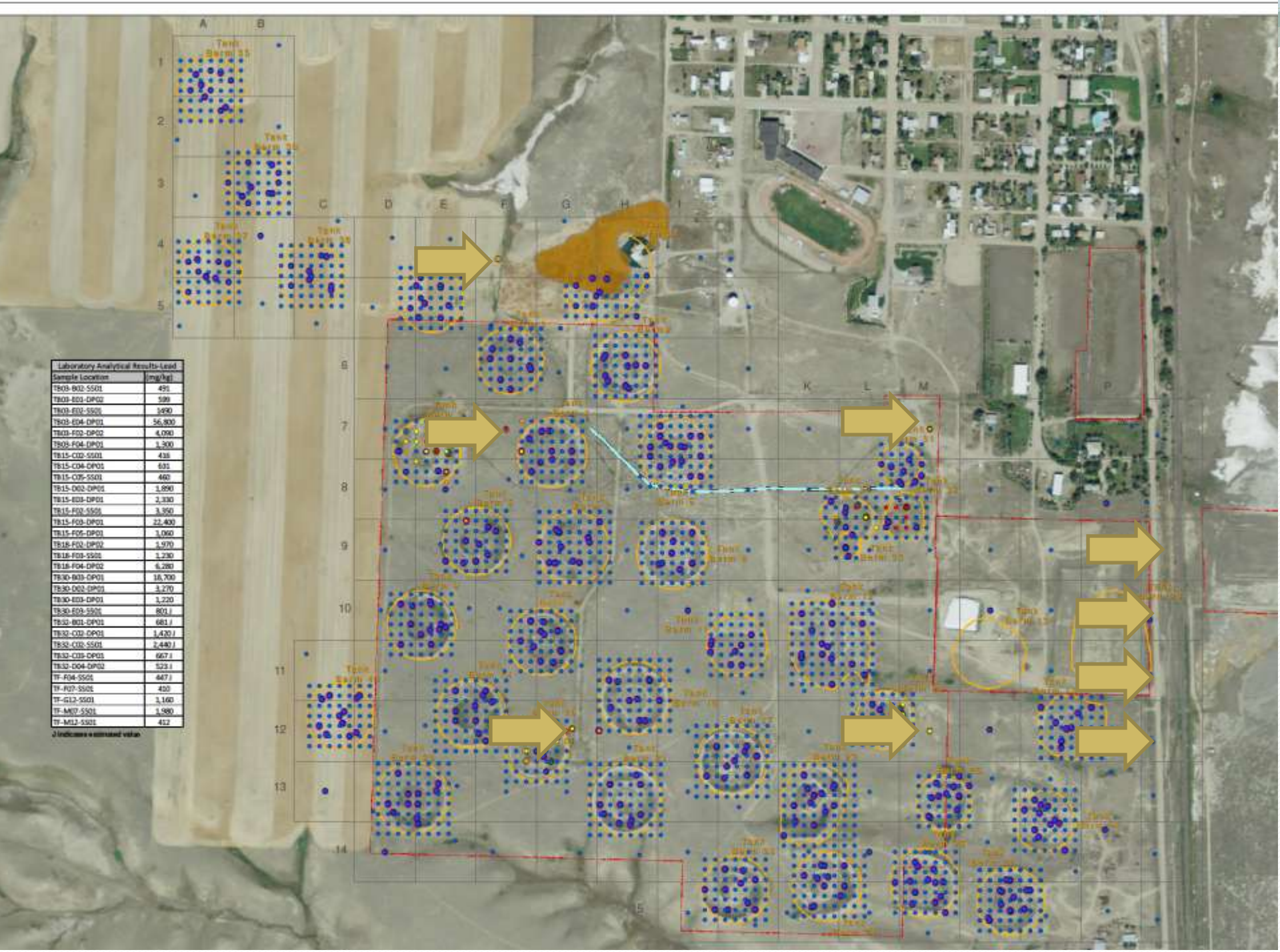
Surface Soils – Tank Berms and Refinery property

- 1,800 locations field tested in tank berms, over 3,000 samples total
- 50 locations field tested in tank farm, 383 samples total
- 6 out of 39 tank berms have lead levels above EPA RSL (400 ppm)
- 9 out of 50 tank farm samples have lead over EPA RSL



Laboratory Analytical Results-Lead	
Sample Location	(mg/kg)
TB03-E01-DP02	599
TB03-E04-DP01	56,800
TB03-F02-DP02	4,090
TB03-F04-DP01	1,300
TB15-C04-DP01	631
TB15-D02-DP01	1,890
TB15-E03-DP01	2,330
TB15-F03-DP01	22,400
TB15-F05-DP01	1,060
TB18-F02-DP02	1,970
TB18-F03-SS01	1,230
TB18-F04-DP02	6,280
TB30-B03-DP01	18,700
TB30-D02-DP01	3,270
TB30-E03-DP01	1,220
TB32-B01-DP01	681 J
TB32-C02-DP01	1,420 J
TB32-C03-DP01	667 J
TB32-D04-DP02	523 J

J indicates estimated value

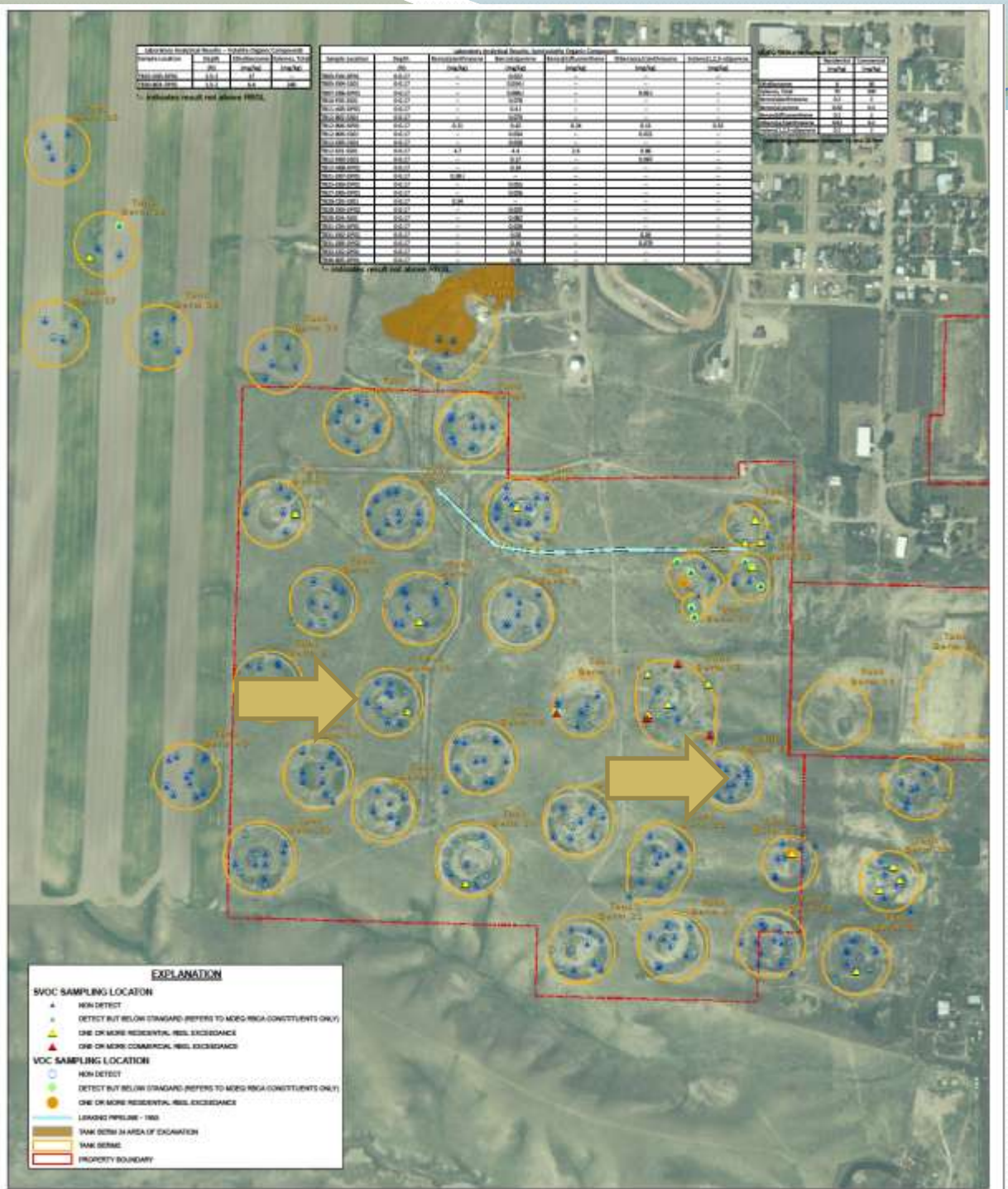


Laboratory Analytical Results-Lead	
Sample Location	(mg/kg)
TB03-B02-SS01	491
TB03-E01-DP02	599
TB03-E02-SS01	3490
TB03-E04-DP01	56,800
TB03-F02-DP02	4,090
TB03-F04-DP01	1,300
TB15-C02-SS01	416
TB15-C04-DP01	631
TB15-C05-SS01	460
TB15-D02-DP01	1,890
TB15-E03-DP01	2,330
TB15-F02-SS01	3,350
TB15-F03-DP01	22,400
TB15-F05-DP01	1,060
TB18-F02-DP02	1,970
TB18-F03-SS01	1,230
TB18-F04-DP02	6,280
TB30-B03-DP01	18,700
TB30-D02-DP01	3,270
TB30-E03-DP01	1,220
TB30-E03-SS01	801 J
TB32-B01-DP01	681 J
TB32-C02-DP01	1,420 J
TB32-C02-SS01	2,440 J
TB32-C03-DP01	667 J
TB32-D04-DP02	523 J
TF-F04-SS01	447 J
TF-F07-SS01	410
TF-G12-SS01	1,160
TF-M07-SS01	1,980
TF-M12-SS01	412

J indicates a estimated value

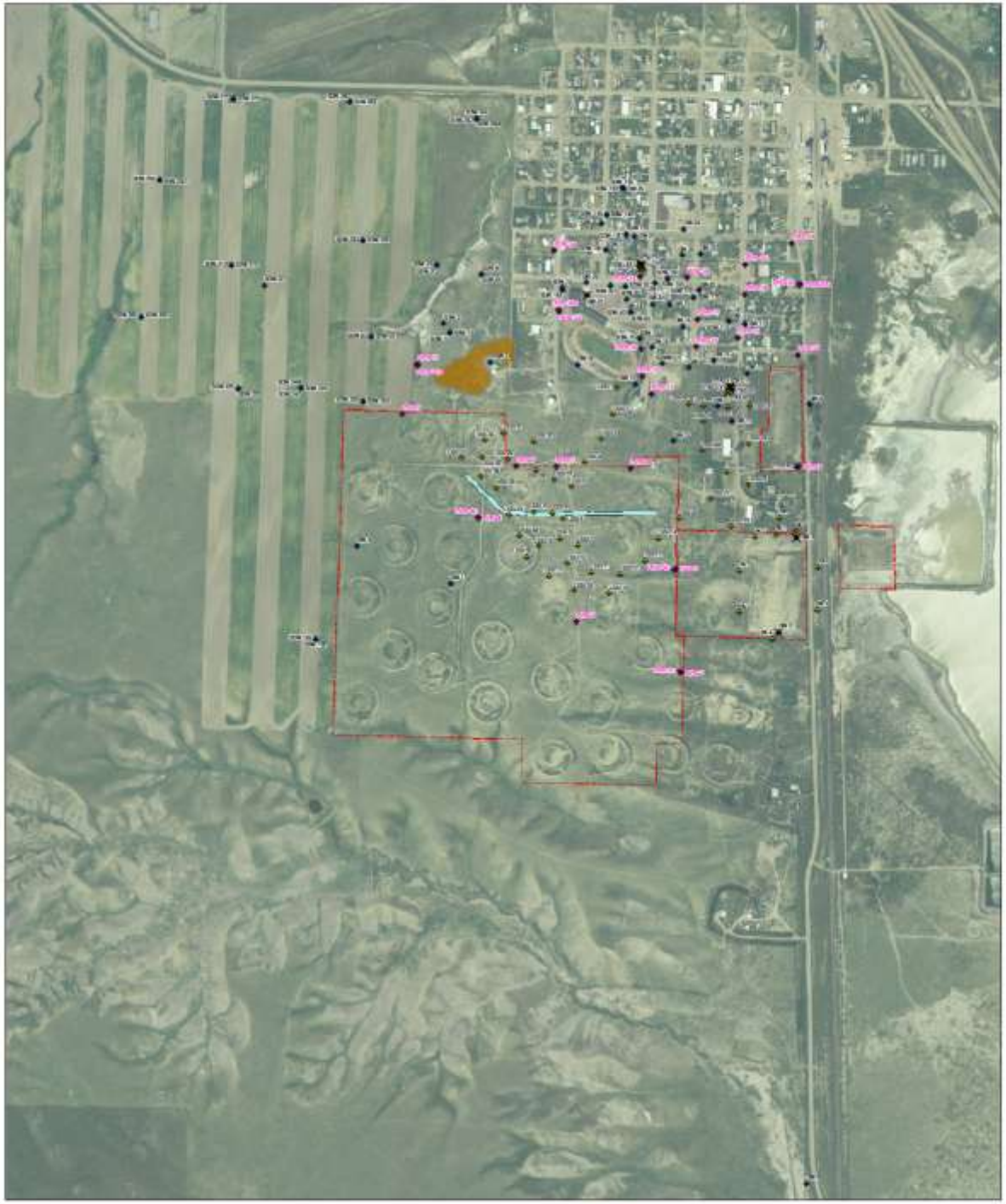
Subsurface Soils in Tank Berms

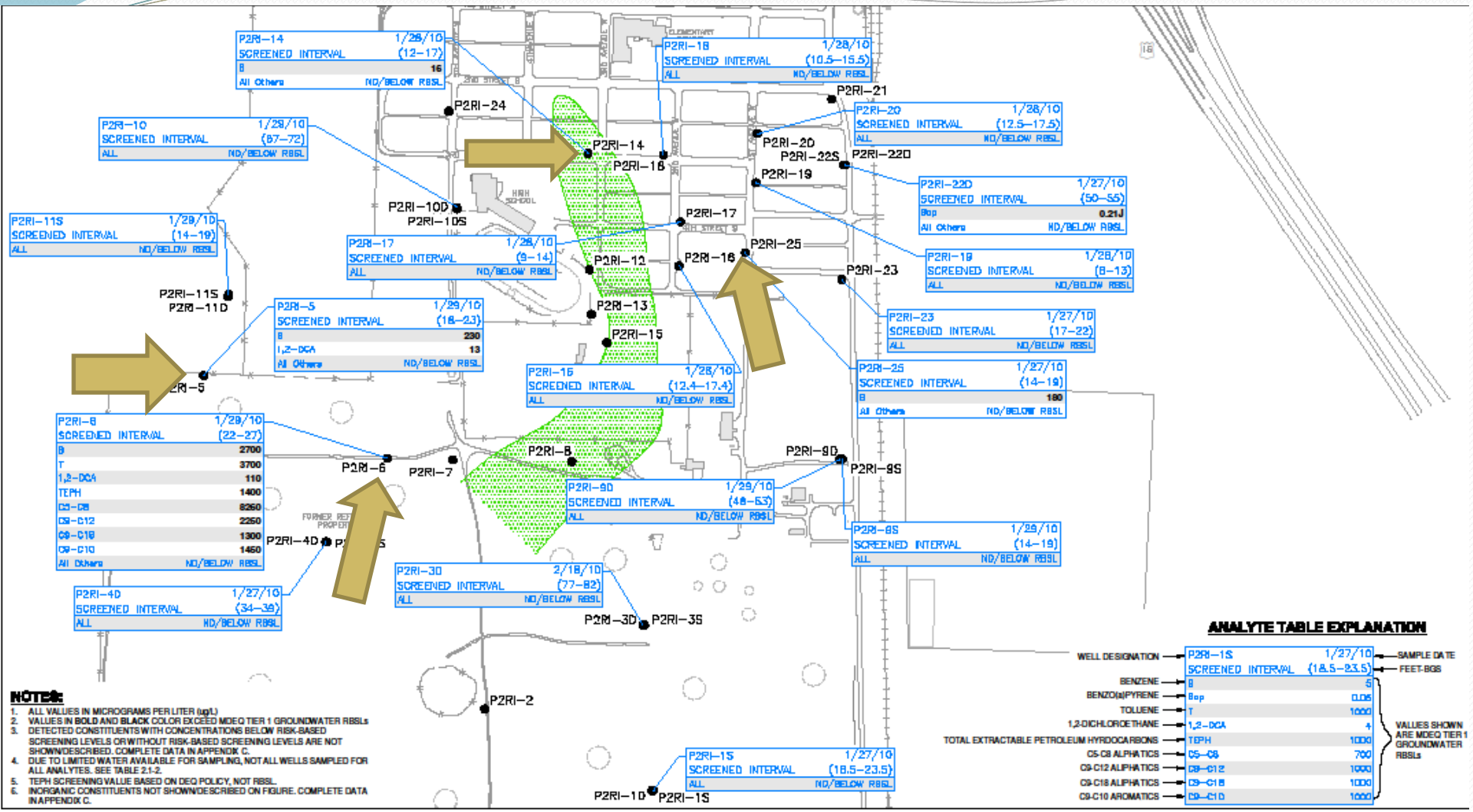
- 15 out of 39 tank berms have exceedences of DEQ screening levels for petroleum-related constituents
- 2 tank berms found to have petroleum on top of the groundwater (tank berms 18 and 10)
- Lead exceedences coincide with berms found to have lead in surface soils
- Impacts fairly localized within tank berms


EXPLANATION
SVOC SAMPLING LOCATION
NON DETECT
DETECT BUT BELOW STANDARD (REFERS TO MDEQ RBCA CONSTITUENTS ONLY)
ONE OR MORE RESIDENTIAL RBSL EXCEEDANCE
ONE OR MORE COMMERCIAL RBSL EXCEEDANCE
VOC SAMPLING LOCATION
NON DETECT
DETECT BUT BELOW STANDARD (REFERS TO MDEQ RBCA CONSTITUENTS ONLY)
ONE OR MORE RESIDENTIAL RBSL EXCEEDANCE
LEAKING PIPELINE - 1993
TANK WITHIN AREA OF EXCAVATION
TANK REMAINING
PROPERTY BOUNDARY

Groundwater

- Additional 25 Shallow and 7 deep groundwater monitoring wells installed
- 19 of 32 wells produce enough groundwater to sample
- 4 wells exceed DEQ-7 levels for petroleum compounds
- No shallow groundwater impacts found in town outside of areas previously known to have groundwater contamination




P2RI-14 1/28/10
SCREENED INTERVAL (12-17)
B 16
All Others ND/BELOW RBSL
P2RI-18 1/28/10
SCREENED INTERVAL (10.5-15.5)
ALL ND/BELOW RBSL
P2RI-21
P2RI-24
P2RI-10 1/29/10
SCREENED INTERVAL (67-72)
ALL ND/BELOW RBSL
P2RI-20 1/28/10
SCREENED INTERVAL (12.5-17.5)
ALL ND/BELOW RBSL
P2RI-14
P2RI-18
P2RI-20
P2RI-22S
P2RI-22D
P2RI-19
P2RI-22D 1/27/10
SCREENED INTERVAL (50-55)
Bap 0.21J
All Others ND/BELOW RBSL
P2RI-10D
P2RI-10S
P2RI-17
P2RI-11S 1/29/10
SCREENED INTERVAL (14-19)
ALL ND/BELOW RBSL
P2RI-17 1/28/10
SCREENED INTERVAL (9-14)
ALL ND/BELOW RBSL
P2RI-12
P2RI-16
P2RI-25
P2RI-19 1/28/10
SCREENED INTERVAL (8-13)
ALL ND/BELOW RBSL
P2RI-23
P2RI-11S
P2RI-11D
P2RI-5 1/29/10
SCREENED INTERVAL (18-23)
B 230
1,2-DCA 13
All Others ND/BELOW RBSL
P2RI-13
P2RI-15
P2RI-23 1/27/10
SCREENED INTERVAL (17-22)
ALL ND/BELOW RBSL
P2RI-16 1/28/10
SCREENED INTERVAL (12.4-17.4)
ALL ND/BELOW RBSL
P2RI-5
P2RI-25 1/27/10
SCREENED INTERVAL (14-19)
B 180
All Others ND/BELOW RBSL
P2RI-8 1/29/10
SCREENED INTERVAL (22-27)
B 2700
T 3700
1,2-DCA 110
TEPH 1400
C5-C8 8260
C9-C12 2250
C9-C18 1300
C9-C10 1450
All Others ND/BELOW RBSL
P2RI-8
P2RI-9D
P2RI-6
P2RI-7
P2RI-9S
P2RI-9D 1/29/10
SCREENED INTERVAL (48-53)
ALL ND/BELOW RBSL
P2RI-4D
P2RI-9S 1/29/10
SCREENED INTERVAL (14-19)
ALL ND/BELOW RBSL
P2RI-30 2/18/10
SCREENED INTERVAL (77-82)
ALL ND/BELOW RBSL
P2RI-4D 1/27/10
SCREENED INTERVAL (34-39)
ALL ND/BELOW RBSL
P2RI-3D
P2RI-3S
P2RI-2
P2RI-1S 1/27/10
SCREENED INTERVAL (18.5-23.5)
ALL ND/BELOW RBSL
P2RI-1D
P2RI-1S
NOTES:
1. ALL VALUES IN MICROGRAMS PER LITER (ug/L)
2. VALUES IN BOLD AND BLACK COLOR EXCEED MDEQ TIER 1 GROUNDWATER RBSLs
3. DETECTED CONSTITUENTS WITH CONCENTRATIONS BELOW RISK-BASED SCREENING LEVELS OR WITHOUT RISK-BASED SCREENING LEVELS ARE NOT SHOWN/DESCRIBED. COMPLETE DATA IN APPENDIX C.
4. DUE TO LIMITED WATER AVAILABLE FOR SAMPLING, NOT ALL WELLS SAMPLED FOR ALL ANALYTES. SEE TABLE 2.1-2.
5. TEPH SCREENING VALUE BASED ON DEQ POLICY, NOT RBSL.
6. INORGANIC CONSTITUENTS NOT SHOWN/DESCRIBED ON FIGURE. COMPLETE DATA IN APPENDIX C.
ANALYTE TABLE EXPLANATION
WELL DESIGNATION
P2RI-1S 1/27/10 SAMPLE DATE
SCREENED INTERVAL (18.5-23.5) FEET-BGS
BENZENE B 5
BENZO(a)PYRENE Bap 0.05
TOLUENE T 1000
1,2-DICHLOROETHANE 1,2-DCA 4
TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS TEPH 1000
C5-C8 ALIPHATICS C5-C8 700
C9-C12 ALIPHATICS C9-C12 1000
C9-C18 ALIPHATICS C9-C18 1000
C9-C10 AROMATICS C9-C10 1000
VALUES SHOWN ARE MDEQ TIER 1 GROUNDWATER RBSLs

Surface Water Drainages

- 8 separate seep or drainage areas sampled (sediment and surface water)
- Continued surface water monitoring for one year
- Drainage 1 surface water samples exceed screening levels for petroleum compounds and lead
- 1 sediment sample in Drainage 4 exceeds screening value for lead

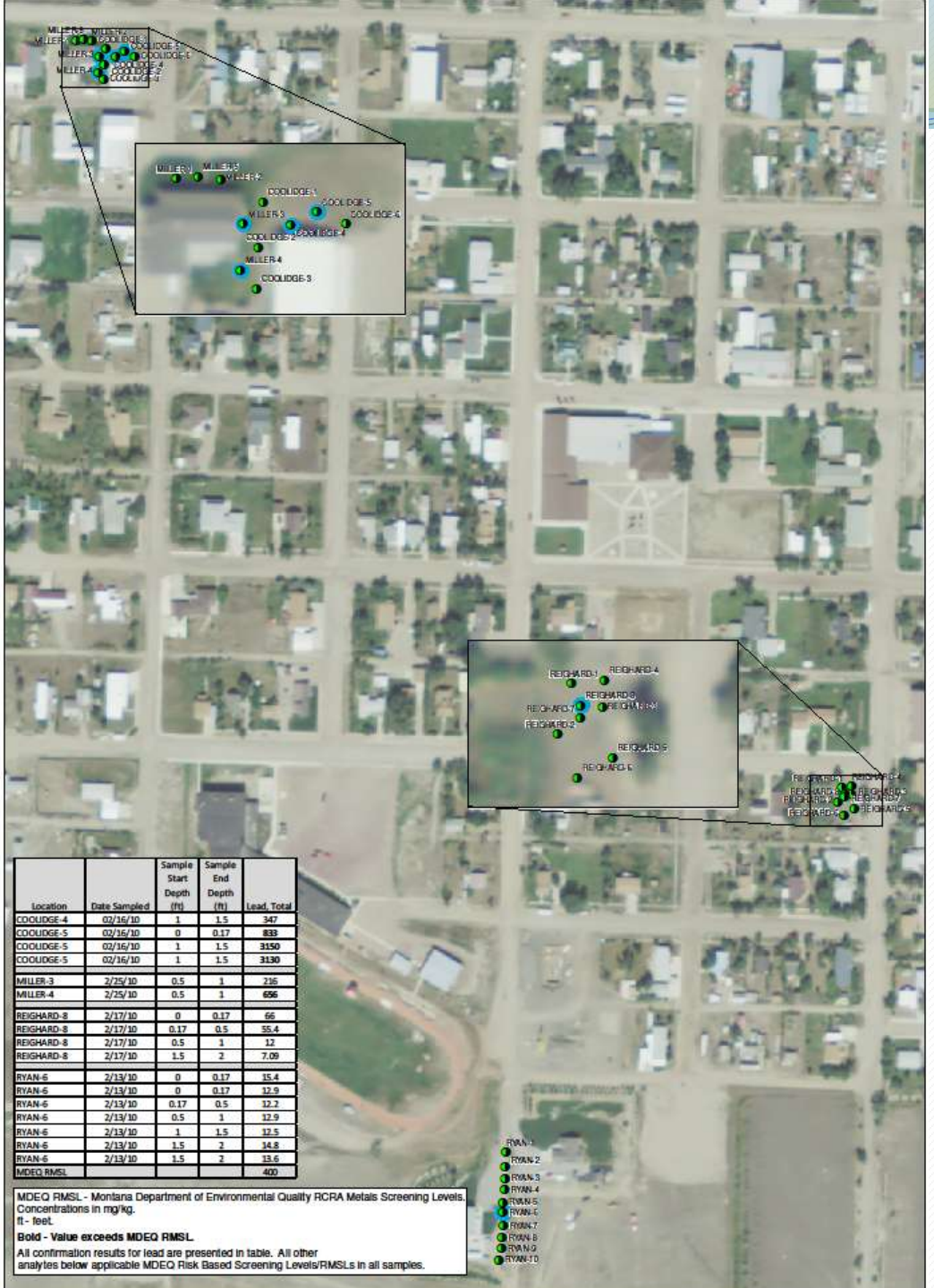

SD3-03
SD3-02
SD03-030310SW
SD3-01
SD1-04
SD1-03
SD01-030810-SW
SD1-02
SD1-01
SD04-01
SD05-01
SD06-01
SD07-01
SD2-01
SD2-02
SD02-030310SW
SD2-03
SD08-01
SD08-030310SW
SD2-04
SD2-05

High School and Elementary School

- High school football field and elementary school playground sampled
- No residential soil screening level exceedences in any samples

Residential Soils sampled

- 5 separate properties sampled
- Only sampled properties after residents requested sampling
- 3 properties found to have lead contaminated refinery soils, 2 properties did not have soil contamination
  - 2 properties with lead contamination have been excavated and restored to original condition, 1 property remains to be cleaned up later this summer



Location	Date Sampled	Sample Start Depth (ft)	Sample End Depth (ft)	Lead, Total
COOLIDGE-4	02/16/10	1	1.5	347
COOLIDGE-5	02/16/10	0	0.17	**833**
COOLIDGE-5	02/16/10	1	1.5	**3150**
COOLIDGE-5	02/16/10	1	1.5	**3130**
MILLER-3	2/25/10	0.5	1	216
MILLER-4	2/25/10	0.5	1	**656**
REIGHARD-8	2/17/10	0	0.17	66
REIGHARD-8	2/17/10	0.17	0.5	55.4
REIGHARD-8	2/17/10	0.5	1	12
REIGHARD-8	2/17/10	1.5	2	7.09
RYAN-6	2/13/10	0	0.17	15.4
RYAN-6	2/13/10	0	0.17	12.9
RYAN-6	2/13/10	0.17	0.5	12.2
RYAN-6	2/13/10	0.5	1	12.9
RYAN-6	2/13/10	1	1.5	12.5
RYAN-6	2/13/10	1.5	2	14.8
RYAN-6	2/13/10	1.5	2	13.6
MDEQ RMSL				400

MDEQ RMSL - Montana Department of Environmental Quality RCRA Metals Screening Levels.
Concentrations in mg/kg.
ft - feet.

Bold - Value exceeds MDEQ RMSL.

All confirmation results for lead are presented in table. All other analytes below applicable MDEQ Risk Based Screening Levels/RMSLs in all samples.

Phase II Remedial Investigation

July 2010 to present

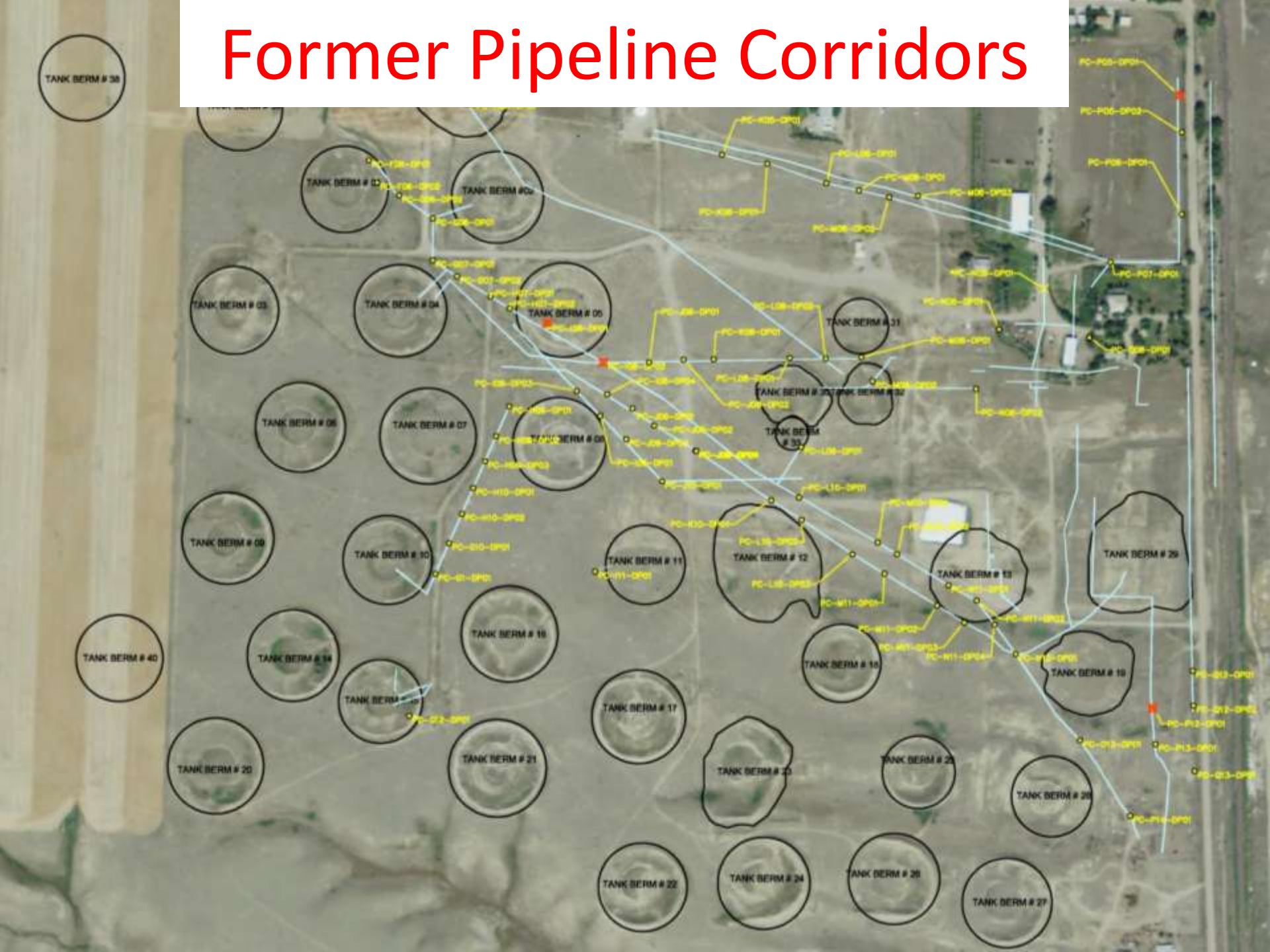
Phase II Remedial Investigation

- Goal: To completely identify all remaining contamination associated with the former refinery
- Field work began July 2010 and has continued (with winter work stoppage January – April) to present
- Expect field work to be complete summer/fall 2011
- Report due to DEQ providing all data and findings of investigation 120 days after receipt of last sample data

Investigation Overview

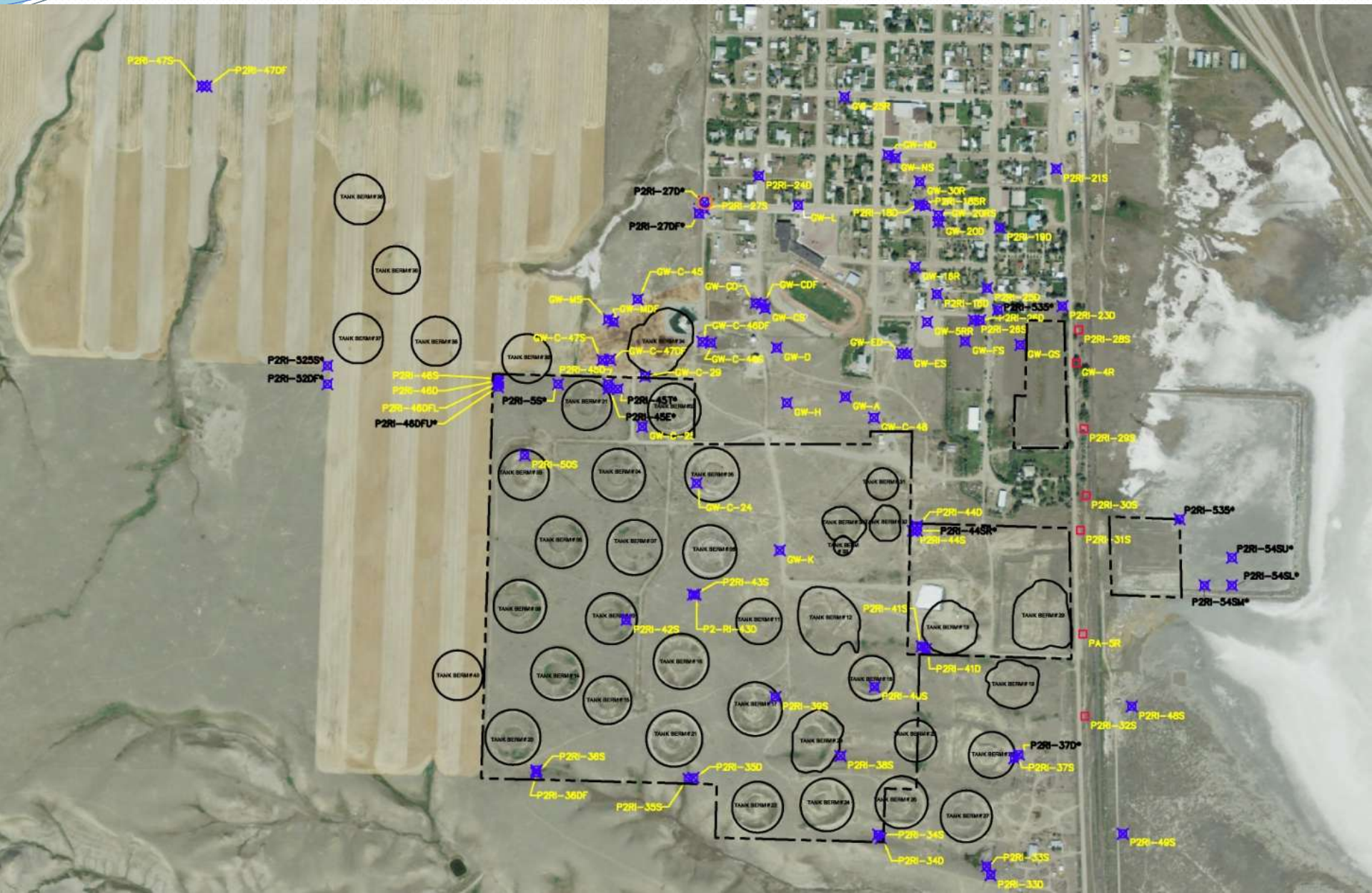
- Soil below former pipeline corridors
- Delineation of impacts found Sept. 2009 – March 2010
- Asphalt/Cinder areas
- Snowcap refinery
- Railroad loading/offloading racks
- Groundwater and petroleum in groundwater
- Soils transported from the refinery
- Pumping tests (5 areas)
- Abandonment/replacement of older wells
- Resample VCP excavation areas

Former Pipeline Corridors

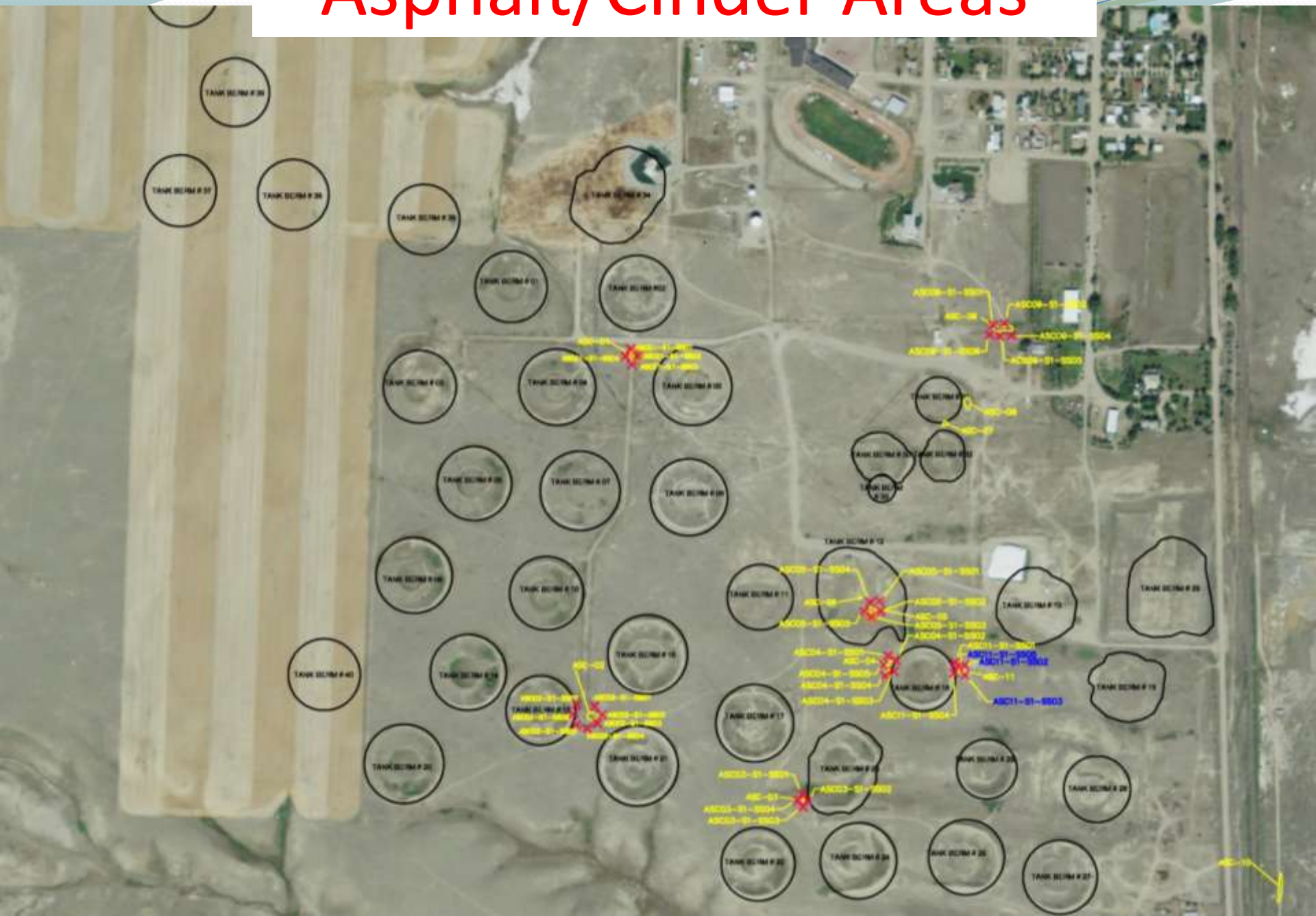


Railroad Loading Racks

Groundwater Monitoring Wells

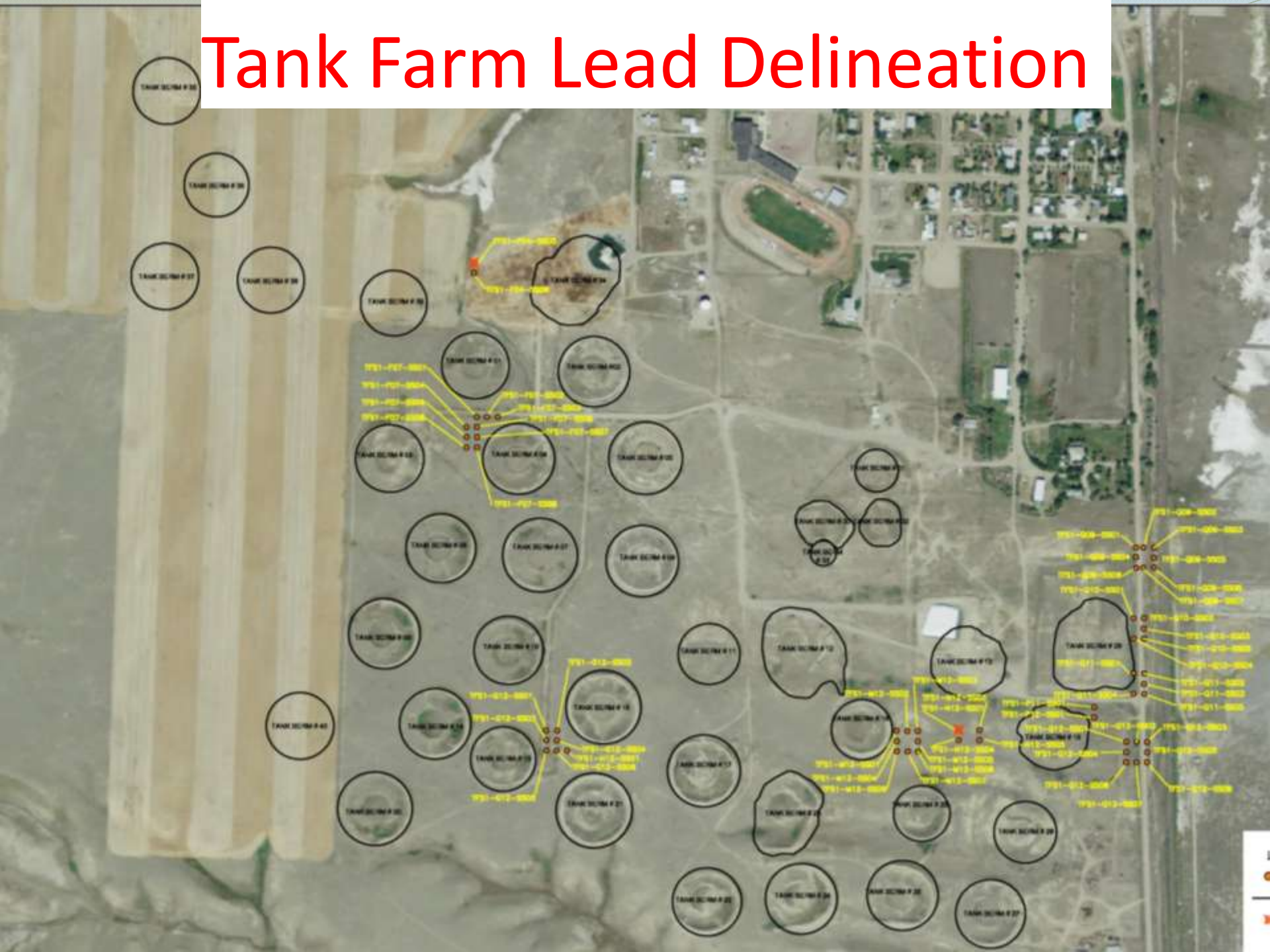


Asphalt/Cinder Areas



VCP Excavation Areas

Tank Farm Lead Delineation

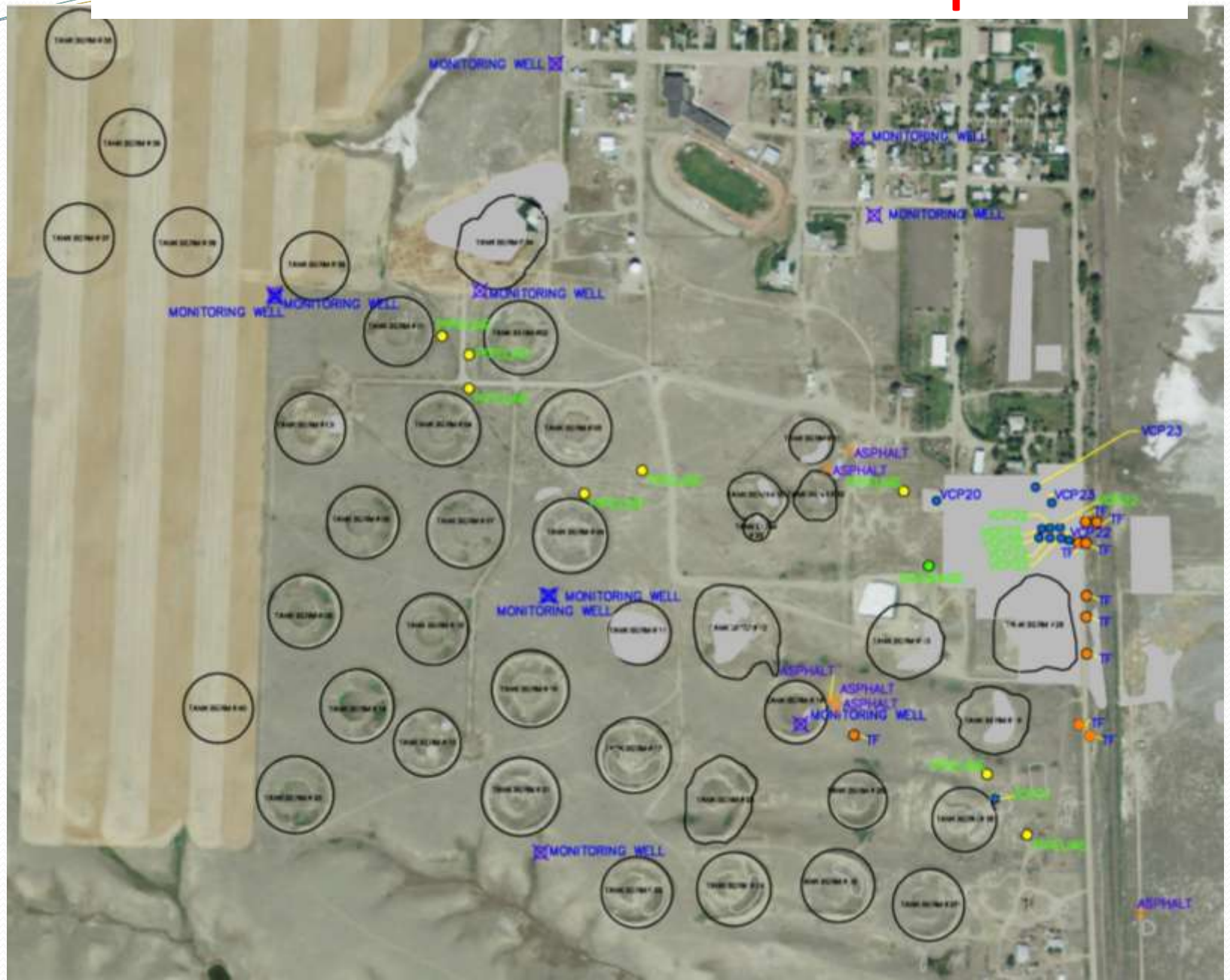


Pumping Test Areas

Drainage 1 Samples

Drainage 4 Samples

Field Observation of Impacts




Thank you for Attending.
Questions?
REFINERS
BURST